user manual


# pocket tools

## dual para eq


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| Contents | Page |
|---|---|
| 1. Introduction | 3 |
| 2. Safety Instructions | 4 |
| 3. Controls and Connections | 5 |
| 4. Operation Summary | 6 |
| 4.1 Cabling and Starting-up | 6 |
| 4.2 Level Adjustment | 6 |
| 5. Functional Characteristics | 7 |
| 5.1 phase | 7 |
| 5.2 bypass | 7 |
| 5.3 equalizer | 7 |
| 5.4.1 frequency poti-rotation | 7 |
| 5.4.2 bandwidth poti-rotation | 7 |
| 6. Technical Specifications pocket tools dual para eq | 8 |
| 7. Circuit Diagram pocket tools dual para eq | 9 |


# 1. Introduction

## Welcome to AER!

Thank you for purchasing an AER **Pocket Tool**. You are now the owner of a professional audio device, designed and manufactured to the highest pro audio technical specifications; capable of shaping, maximizing and delivering the tonal character of your instrument. At AER our complete focus, some say obsession, is on the 'true' reproduction of natural acoustic sound. A lifetime spent listening to and working with acoustic instruments helps us to create and refine the very best devices available; to enable you to craft your own unique acoustic identity. Make your instrument the very best it can be ...

Please take a moment to read this brief manual. We want you to understand how our product works and what it can do for you. We want you to gain benefit from its many features but most of all we want you to ENJOY it!

The **dual para eq** is a compact, parametric 2-band-equalizer, which you can apply to a signal chain to lift or lower certain frequencies. Parametric means not only lifting or lowering, but also adjusting separately position and width of frequency bands.

So it does not only enable you to equalize frequency response errors (hence the name **equalizer)** and to suppress feedbacks or resonance peaks, but it may also be used as a flexible tone control for purposeful sound manipulations.

According to its application in a signal chain, the input stage of the **dual para eq** has been laid out unlike an instrument preamp (e.g. for pickups or microphones) as pure level adjustment stage. With the **phase** switch the phasing of the processed signal can be reversed if necessary. Finally the entire **dual para eq** device can be bypassed by pressing the **bypass** switch, allowing for a comfortable A/B comparison.

All **pocket tools** need energy for their high-grade circuits and are powered by **24V-power-supplies**. An appropriate supply is included in delivery.

Read on and have fun using your **dual para eq**!

# 2. Safety Instructions

The following guidelines shall help minimize the risk of injury through fire or electric shock.

1. Carefully read these safety notes before you use the device!

2. Keep these safety notes in a safe place.

3. Pay attention to all warnings, instructions and additional texts on the unit.

4. Do not install or use your device in close proximity to water or if you are wet yourself.

5. Use your device in a safe place where nobody can step on cables or trip over and damage them.

6. Always pull the mains plug before cleaning your device. Use only a dry cloth for cleaning. Avoid the use of detergents and do not let any liquids seep into the unit.

7. Never install your device close to units with strong electromagnetic fields such as large mains transformers, revolving machines, neon illumination etc. Do not lay signal cables parallel to power current cables.

8. There are no user-serviceable components inside the unit. To avoid the risk of an electric shock, the unit must not be opened. All maintenance, adjustment and repair works should be carried out by qualified staff only. Any unauthorized tampering will void the 2-year warranty.

9. In keeping with the EMV regulations screened cables with correctly fitted connectors must be used for all signal connections.

10. Always use an earthed power supply with the correct mains voltage. If you are in doubt about the power outlets ground, have it checked by a qualified technician.

11. Cable up your device only when it is powered off.

# 3. Controls and Connections


| Top side | |
|---|---|
| **gain** | input level control |
| **clip** | overload indicator |
| **phase** | phase invert switch |
| **bypass** | bypass switch with indicator light |
| | ▁▂ = not active ▂▁ = active |
| **eq one / eq two** | |
| **level** | level control |
| **bandwidth** | filter bandwidth control |
| **frequency** | filter frequency control |
| **f1/f2** | filter frequency range switch |


| Front side | |
|---|---|
| **input** | signal input, 6,3 mm mono jack socket |
| **power** | on/off-status indicator |


| Rear side | |
|---|---|
| **line out** | signal output, 6,3 mm mono jack socket |
| **dc 24 V** | power supply connector socket (24 Volt DC) |

# 4. Operation Summary

## 4.1 Cabling and Starting-up

Before connecting to the mains, please ensure that your local mains voltage (e.g. 230V in mainland Europe, 120V in the USA) is suitable for the voltage input range of the included power supply. The relevant specs and safety symbols are printed on the rear side of the unit.

Please ensure that **gain**- and **level**-controls are in their middle position (centre detent) and all other controls are turned all the way to left. The pushbuttons should be off, i.e. not pushed.

Make all signal cable connections as desired (e.g. output of upstream device to **input, line out** to input of downstream device). Now you can connect the unit to the power supply. The green **power** control LED indicates operational readiness.

### Note: 24V power supply

The included 24VDC power supply is a certified wide-range model, capable of handling input voltages between 100V and 240V. A substantial amount of research, effort and testing went into the selection of this power supply. It is critical to the function of the preamp – please use no other power supply!
Also please bear in mind that any device powered from a power supply (as opposed to battery operation), may suffer interference carried by the electricity supply itself. To avoid this, always try and keep signal cables as short as possible.
We have opted for a "non-earthed power supply" (class 2 with protective insulation) in order to avoid unwanted earth or ground loops that occur when using several earthed mains powered devices in a signal chain.

### Note: Level compensating amplifier

The **dual para eq** is not an instrument preamp. Consequently it is not recommended to directly connect e.g. a microphone or a guitar pickup to the **dual para eq**.

The **dual para eq** features a high-quality level adjustment stage (feasible for pro audio and hifi levels) which allows to set the gain within a +/-10 dB range. The centre position is equivalent to 0 dB, i.e. the level remains unchanged (unity gain). Turning this control counterclockwise will lower the signal level, turning it clockwise will boost it.

## 4.2 Level adjustment

For the **dual para eq** the line output level delivered by the preceding device should already be sufficient for an optimal drive thus an actual level setting is not necessary. Please note that the filter stages of the **dual para eq** are active and will therefore affect the overall level setting.

The **clip** indicator monitors all critical points in the signal path and indicates excessive signal levels (overdrive, distortion). In that case turn down the **gain** control to lower the signal level. However, with too high signal levels in the **dual para eq** (clipping) it may be advisable to lower the signal level on the preceding unit.

# 5. Functional Characteristics

## 5.1 phase

The **phase** switch allows reversal of the phase of the output signal of the **dual para eq** relative to the input signal by 180°, thus matching it to the phasing of other devices in your signal chain.

## 5.2 bypass (bypass switch)

The **bypass** is designed as a „hard-wire"-type – directly connected – bypass. This means that while in bypass mode, the signal will not pass through any other electronics, the **dual para eq** is completely bypassed. The **bypass** switch allows you to compare the input signal with the signal processed by the **equalizers** (A/B comparison). In case of an A/B comparison the **gain** control is used to compensate the level differences of the signals to be compared. (see above **4.2 Level adjustment**).

## 5.3 equalizer

The **equalizers** are two parametric filter networks, adjustable from **90 Hz bis 11 kHz** in two ranges. **f1 = 90 Hz – 1,6 kHz** and **f2 = 680 Hz – 11 kHz**. The ranges have been designed to meet the special requirements of acoustic instruments, microphones and other signal sources and to allow useful and accurate signal manipulation in order to suppress resonances and feedback. The filter technology ensures a constant bandwidth at any selected frequency.

### 5.4.1 frequency poti-rotation

| Poti-Position | Rotation 300° | f1 | f2 |
|---|---|---|---|
| Linksanschlag | 0% | 55 Hz | 600 Hz |
| | 50% | 100 Hz | 1,3 KHz |
| | 75% | 180 Hz | 2,3 KHz |
| | 87,5% | 300 Hz | 3,7 KHz |
| | 93% | 455 Hz | 5,6 KHz |
| Rechtsanschlag | 100% | 870 Hz | 11 KHz |

### 5.4.2 bandwidth poti-rotation

| Poti-Position | Rotation 300° | Oktave |
|---|---|---|
| Linksanschlag | 0,0% | 1/6 |
| | 12,5% | 1/3 |
| | 25 % | 1/2 |
| | 50% | 2/3 |
| Rechtsanschlag | 100% | 1 |

**Note:**

A parametric equalizer is a filter network where all features of a filter (amplitude, i.e. boost or cut = level, frequency and Q factor = bandwidth) can be adjusted. Parametric means that not only the boost /cut, but also the location and width of the frequency bands can be adjusted. It offers the possibility to equalize (flatten) notches or peaks in the frequency response (hence the name equalizer) and to suppress feedbacks or resonant peaks. It can also be used as a flexible tone control for targeted sound alterations.

**Sample application:**

Suppose you notice an excessive signal increase (feedback). To counteract you will need to reduce the signal level of the corresponding frequency range. To do this, first set the **level** control (amplitude) to maximum cut (left-hand stop). Make sure that the **bandwidth** control is set to maximum bandwidth (right-hand stop). Using the **frequency** control you can now detect the centre frequency of the offending frequency range. (use the **f1/f2** preselect switch also) The peak should now be gone. To enhance the sonic result, you may reduce the **bandwidth** (increase the Q factor) or lower the amplitude (decrease the reduction), if necessary.

Experiment and enjoy your new route to alternative soundscapes!

Any questions or suggestions? Please do contact us at:

tachauch@aer-amps.com

Thanks for reading!

# 6. Technical Specifications: pocket tools **dual para eq**

| **Input** | |
|---|---|
| **input** | Unbalanced line input<br>¼" jack (6.35 mm)<br>Gain adjustment range: –10…+10 dB,<br>0 dB at center notch of **gain** control.<br>Min. input voltage: 300 mV (–10 dBV)<br>Max. input voltage: 9 V (+19 dBV)<br>Input impedance: 10 kΩ<br>Signal-to-noise ratio (A-weighted)<br>0 dB gain: 108 dB<br>Min. gain: 108 dB<br>Max. gain: 103 dB<br>Frequency response: 20 Hz…20 kHz / ±0.5 dB<br>THD + N (1 kHz): < 0.1%<br>Phantom power: Ring contact of **line out** is connected to ring contact of **input**. Any external phantom power applied at the ring of **line out** will be available at the input. |
| | **Clip indicator**<br>Red LED<br>Headroom: 12 dB |
| **Output** | |
| **line out** | Unbalanced line output<br>¼" jack (6.35 mm)<br>Nominal output voltage: 1 V (0 dBV)<br>Max. output voltage: 9 V (+19 dBV)<br>Output impedance: 47 Ω<br>Min. load impedance: 2 kΩ |
| **Parametric equalizer** | |
| **Number and type of filters** | Two adjustable band boost / cut (bell curve) filters |
| **Frequency range** | 90 Hz…1.6 kHz / 680 Hz…11 kHz<br>Both filters are switchable to either frequency range. |
| **Gain range** | ±15 dB at center frequency of filter |
| **Bandwidth range** | 0.4 – 2.2 octaves<br>("half-dB" method, measured between +7.5 dB points with **level** set to +15 dB) |
| **Power** | |
| **Supply voltage** | 24 V=, 0.2 A<br>Use only supplied mains adapter. |
| **Mains adapter** | Mains voltage: 100-240 V~<br>Power consumption when used with Dual Para Eq: max. 10 W |
| **General** | |
| **Metal housing** | Aluminium |
| **Finish** | Anodized black |
| **Dimensions** | 65 mm (2.56") high<br>105 mm (4.13") wide<br>135 mm (5.31") deep |
| **Weight** | 430 g (0.95 lbs) |

**Definitions and conditions**

**Input and output voltages** are RMS values for a sine signal and 1 kHz unless stated otherwise.
**Tone controls** in neutral position (equalizer level in center position) unless stated otherwise.
**Min. input voltage:** Input voltage for nominal output voltage at line out with gain fully clockwise.
**Max. input voltage:** Permissible input voltage that does not cause distortion more than the rated THD + N (assuming suitable control settings).
**Signal-to-noise ratio (SNR):** Ratio of nominal output voltage to noise voltage at line out, at specified gain setting, input shorted, 20 Hz…20 kHz.
**THD + N:** Total harmonic distortion + noise for nominal output voltage at line out

Specifications and appearance subject to change without notice.

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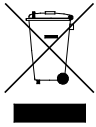
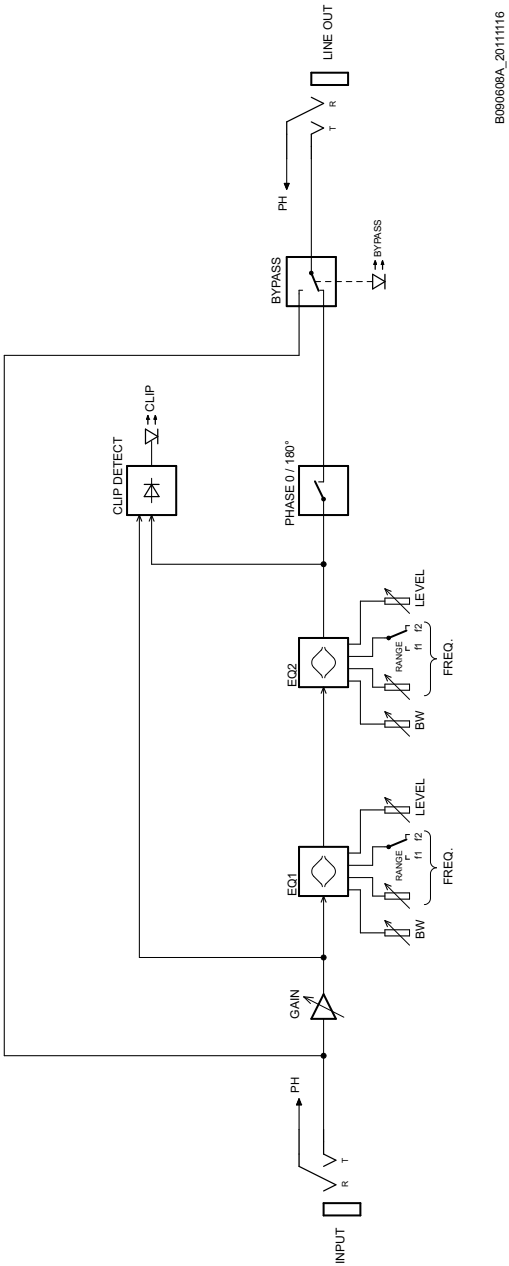


# 7. Circuit Diagram: pocket tools **dual para eq**



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